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Project Title: Accelerated Development of Fusarium Resistant Barley Varieties.

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PROJECT 2 ABSTRACT

(1 Page Limit)

Fusarium Head Blight (FHB) or scab, caused by the fungus *Fusarium graminearum*, has emerged as the major factor limiting barley production in the Midwestern United States. The primary goals of this project are to enhance our understanding of the biology/genetics of resistance to *Fusarium* head blight (FHB) in barley, develop methodologies that improve our ability to screen and select for resistance, and to release FHB resistant malting barley varieties. To accomplish these goals, we propose a series of field and greenhouse experiments and variety trials. These trials will enable us to identify resistant lines that will be used as parents in advanced cycle crosses to develop resistant varieties, or be evaluated in advanced disease, yield and quality trials as new resistant variety candidates. In addition to breeding activities, we will conduct experiments to better define the relationships among disease severity, grain protein, accumulation of DON in grain, days to anthesis, spike morphology and maturity. We will evaluate populations derived from crosses among resistant and susceptible varieties that segregate for some or all of these other traits. We will employ marker assisted selection in early generation (F2) populations using markers linked to QTL regions that have been mapped and validated in Chevron and Frederickson. These activities should contribute directly to the development of FHB resistant barley varieties and enhance our understanding of resistance to FHB. Both of these outcomes are necessary to integrate FHB resistant varieties as part of an overall strategy for disease management.